

# Informational Leaflet 109

## TIKCHIK LAKE SYSTEM COMMERCIAL FRESHWATER FISHERY

By:

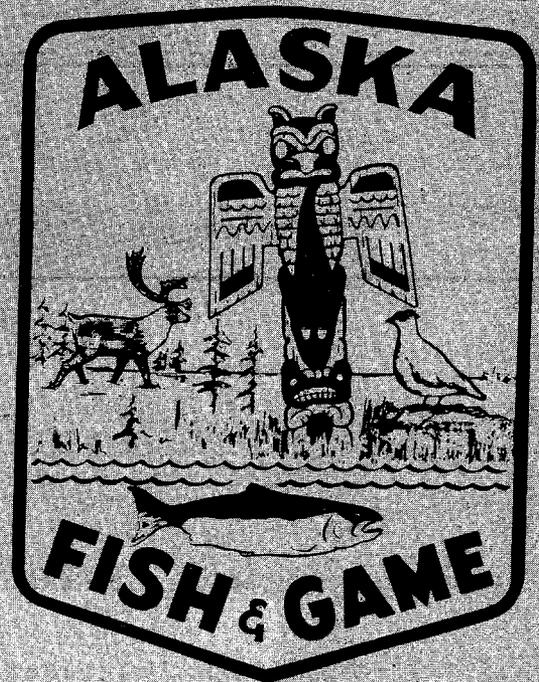
Carl Yanagawa  
Division of Sport Fish  
Dillingham, Alaska

August 25, 1967

STATE OF ALASKA  
WALTER J. HICKEL - GOVERNOR

DEPARTMENT OF  
FISH AND GAME

**MERRAN G. NELSON** - COMMISSIONER  
SUPPORT BUILDING, JUNEAU



## TABLE OF CONTENTS

	Page
Introduction . . . . .	1
Description of the Area. . . . .	3
Fishing Methods. . . . .	3
Spring Fishery. . . . .	3
Fall Fishery. . . . .	3
Fishing Regulations . . . . .	6
Commercial Fishery . . . . .	6
Spring, 1966. . . . .	8
Fall, 1966. . . . .	8
Spring, 1967. . . . .	8
Fishery Summary . . . . .	12
Sampling of the Commercial Catch . . . . .	12
Biology. . . . .	13
Age Composition . . . . .	13
Sex Composition . . . . .	15
Length and Weight . . . . .	15
Parasitism. . . . .	15
Associated Studies . . . . .	15
Fisheries Research Institute. . . . .	15
Canadian Studies. . . . .	16
Sport Fishery . . . . .	16
Problems. . . . .	17
Acknowledgement. . . . .	18
Literature Cited . . . . .	19
Tables:	
Table 1. Morphometry of the Three Lower Lakes in the Tikchik System. . . . .	5
Table 2. List of Common and Scientific Names of Fishes Collected by Fisheries Research Institute Personnel in the Tikchik Lake System . . . . .	9
Table 3. Summary, Tikchik Lake, Commercial Catch . . . . .	10-11
Table 4. Summary of Age Composition of Humpback Whitefish and Lake Trout from the Tikchik Lakes, 1964 and 1965. . . . .	14

TABLE OF CONTENTS (Cont.)

	Page
Figures:	
Figure 1. Tikchik Lake System, Bristol Bay, Alaska . . . . .	4
Figure 2. Commercial Catch Areas Tikchik Lake System Bristol Bay, Alaska. . . . .	7

# TIKCHIK LAKE SYSTEM COMMERCIAL FRESHWATER FISHERY

by

Carl Yanagawa  
Fishery Biologist

## INTRODUCTION

The Alaska Department of Fish and Game has as one of its primary objectives the development of new fisheries on previously unharvested stocks of fish. The development of a harvest on the freshwater stocks of whitefish, char and herring has met with a minimum of success. This is attributed in a large part to the difficulties in overcoming transportation and marketing problems--economic factors. The Department will continue to aid in the utilization of our untapped freshwater fisheries resources within the bounds of sound conservation practices. The impact of a freshwater commercial fishery on a current or potential sport fishery must be an important consideration in the Department's approach.

Since 1963, increased interest has been directed toward the development of a freshwater commercial fishery in the Bristol Bay area. The Department has been monitoring the pilot fishing efforts and evaluating the potential and the affect of the fishery on the stocks of fish and on other uses of the resource.

Consequently, an investigational program was established to evaluate the initial commercial fishing efforts on the Tikchik Lake area in 1966 and 1967. Both the Divisions of Sport Fish and Commercial Fisheries participated in monitoring this Tikchik System freshwater commercial fishery. Data was gathered to determine the impact on the population of fishes harvested and to make cooperative recommendations for future study and management of the commercial fishery as it may affect all of the system's fishery resources.

The Alaska Freshwater Fisheries Company initiated the 1966-67 freshwater commercial fishery in Tikchik Lake. Fishing was conducted in the spring and fall of 1966 and during the spring of 1967.

The purpose of initiating a freshwater commercial fishery in the Bristol Bay area is to provide year-round income for the residents of the area. Various groups around the Dillingham area have been interested in such a program since 1962. Attempts to establish a winter freshwater fishery were made in Lake Clark and Lake Iliamna during the winter of 1963-64 (Metsker, 1967).

Problems that have plagued the Iliamna Lake freshwater commercial fishery have also appeared in the Tikchik Lake fishery (Metsker, 1967). Transportation cost is still the major problem, with marketing next. The only feasible means of transportation to and from the Tikchik Lake system is by charter aircraft since no scheduled airline service is available. Transportation to markets is also a major concern since there are no roads linking Bristol Bay to the continental United States.

During the spring and fall of 1966 the fish were processed in Dillingham and flown to market in Anchorage, while in the spring of 1967 the fish were flown to the midwest in the round.

The 1967 fishery was conducted on an experimental basis to determine if such an operation could be economically feasible. The following is a report on the commercial freshwater fishery in the Tikchik Lakes area.\*

---

\* The data contained in the following report was collected jointly by the Division of Commercial Fisheries and the Division of Sport Fish of the Alaska Department of Fish and Game. The Division of Commercial Fisheries collected all data in the spring and fall of 1966 while that data assembled in the spring of 1967 was gathered by the Division of Sport Fish.

## DESCRIPTION OF THE AREA

The Tikchik Lake system is located approximately 65 air miles north of Dillingham. It drains about 1,486 square miles (Gadau, 1966). Seven lakes make up the Tikchik system (Figure 1). Commercial freshwater fishing was conducted mainly in Tikchik Lake. However, exploratory work was initiated in Nuyakuk Lake and Lake Chauekuktuli. Morphometry of the three lower lakes in the system is shown in Table 1.

## FISHING METHODS

### Spring Fishery

An ice chisel, jigger board and snow machine is standard equipment for the spring fishermen on Tikchik Lake.

A suitable fishing site is located and the ice chisel is employed to open a hole about two feet in diameter. The jigger board is placed under the ice and "jigged" until the required distance is obtained (50 fathoms for a 50 fathom net etc.). The jigger board is operated by means of a manually operated spring loaded ice chisel which propels the board under the ice. A secondary running line is attached to the board which is used to set the net. As the board is "jigged" along it produces a knocking sound. While one person "jigs" another person follows the board as it moves under the ice by the knocking sound. Another hole is chipped in the ice when the desired distance is reached and the board is retrieved. At this stage the fishermen have a running line between the two holes. The net is then attached to one end of the running line and the other end of the running line is tied to a snow machine which pulls the net into the water. Both ends of the net are then attached to poles which are longer than the diameter of the hole and they rest across the hole. All nets were fished on the bottom of the lake during the spring in approximately 45-120 feet of water. Mesh sizes of nets employed during the spring fishery were 4-3/4", 5-3/8", 5-1/2" and 8-1/2" stretch measure.

When the net is pulled, a running line is attached to one end of the net. Both fishermen pull the net from the other end, which is stacked in a pile with the lead line on one side and the corks on the other. As the net is being pulled the fish are picked out. There is no problem of the net freezing together because it freezes as it is being pulled. To reset the net, one fisherman goes to the other end of the net and fastens the running line to his snow machine and pulls the net back into the water. The other fisherman assures that the net reenters the hole properly.

### Fall Fishery

Salmon gill nets of 4-3/4" and 5-3/8" stretch measure were utilized during the fall fishery. Two methods of fishing were employed. One method was to attach one end of the net to a stake on shore and anchor the other end in deep water. A buoy is attached to the anchor line in deep water to which the net is attached. Fishing in this method is essentially the same as that of "set netting" in the salmon fishery.

FIGURE 1

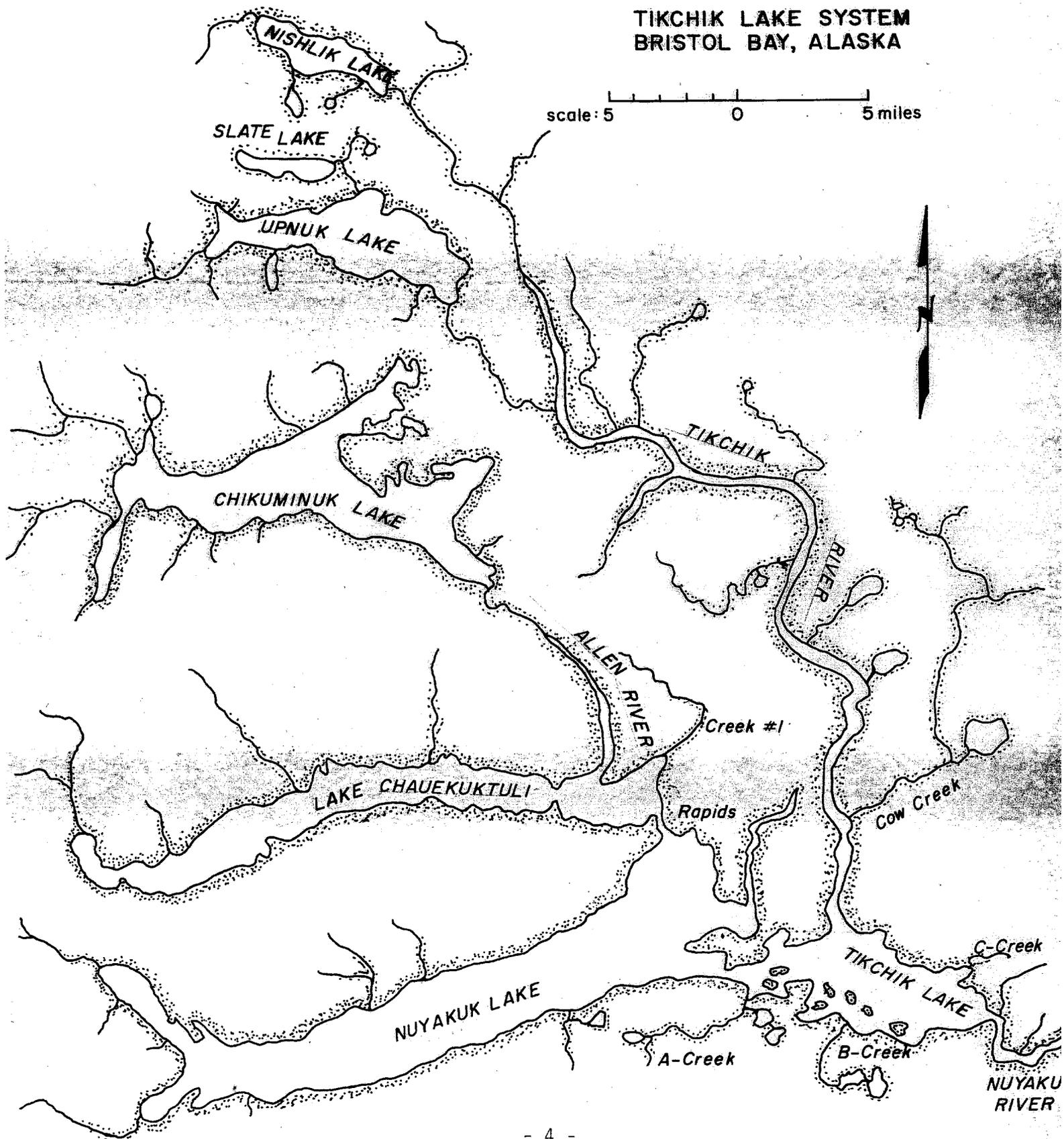


Table 1. Morphometry of the Three Lower Lakes in the Tikchik System.\*

	Tikchik	Nuyakuk	Chauekuktuli
Altitude (ft.)	316.7	316.7	326.7
Max. length (mi.)	9.3	24.8	23.0
Max. depth (ft.)	150.0	943.3	893.3
Mean depth (ft.)	50.0	376.6	370.0
Max. width (mi.)	3.4	3.9	1.9
Mean width (mi.)	2.2	2.2	1.3
Surface area (mi. <sup>2</sup> )	20.5	55.6	31.7
Shore line (mi.)	39.1	76.4	56.5
Volume (km. <sup>3</sup> )	0.8	16.3	8.9

\* Gaudau, 1966.

The other method was to anchor both ends of the gill net in deep water with a buoy attached to both anchor lines.

Skiffs and outboards were used until "freeze-up" when fishing was terminated.

### Fishing Regulations

The freshwater commercial fishery is regulated by permits issued by the Commissioner. Restrictions during the 1966 spring and fall fishery were maintained at a minimum to encourage the establishment of commercial operations. Limitations included nets not to exceed 300 feet in length or contain a mesh size of less than 3-1/2" stretch measure. Fishing was not permitted near known salmon concentrations or beach spawning areas. In the spring of 1967, official closed areas were designated by the Division of Commercial Fisheries which coincided with known spawning grounds and areas of concentration of economically important fish (Figure 2). Regulations which applied were:

- 1) Each fisherman had to obtain a permit which specified the basic conditions permissible for the fishery and which prohibited the taking of salmon, rainbow and grayling. In addition, a written report was required from the processor.
- 2) Every fisherman had to possess the required personal and gear license to fish commercially.
- 3) Minimum net mesh size 4-3/4" stretch measure was established.
- 4) Each fisherman was limited to 300 fathoms of gear.
- 5) Seven closed areas were established to protect resting and spawning areas.
- 6) Fishing was prohibited from June 1 to August 31.

### COMMERCIAL FISHERY

The Tikchik Lake commercial fishery lasted 82 days; 32 days during the spring of 1966, 22 days during the fall of 1966 and 28 days during the spring of 1967. Eight fishermen were licensed to fish during this period. Two fishermen operated in the spring of 1966, two during the fall of 1966 and four during the spring of 1967.

Approximately \$2,300 was paid out to the fishermen for their catch. The total harvest for 1966 and 1967 was 22,884 pounds of all species.

The major obstacle in the fishery was the high cost of transportation. The Tikchik Lake system is 65 air miles north of Dillingham and is accessible only by aircraft. Since the fishery was dealing with a perishable product, costly air transportation was the only means available to get the fish to market.

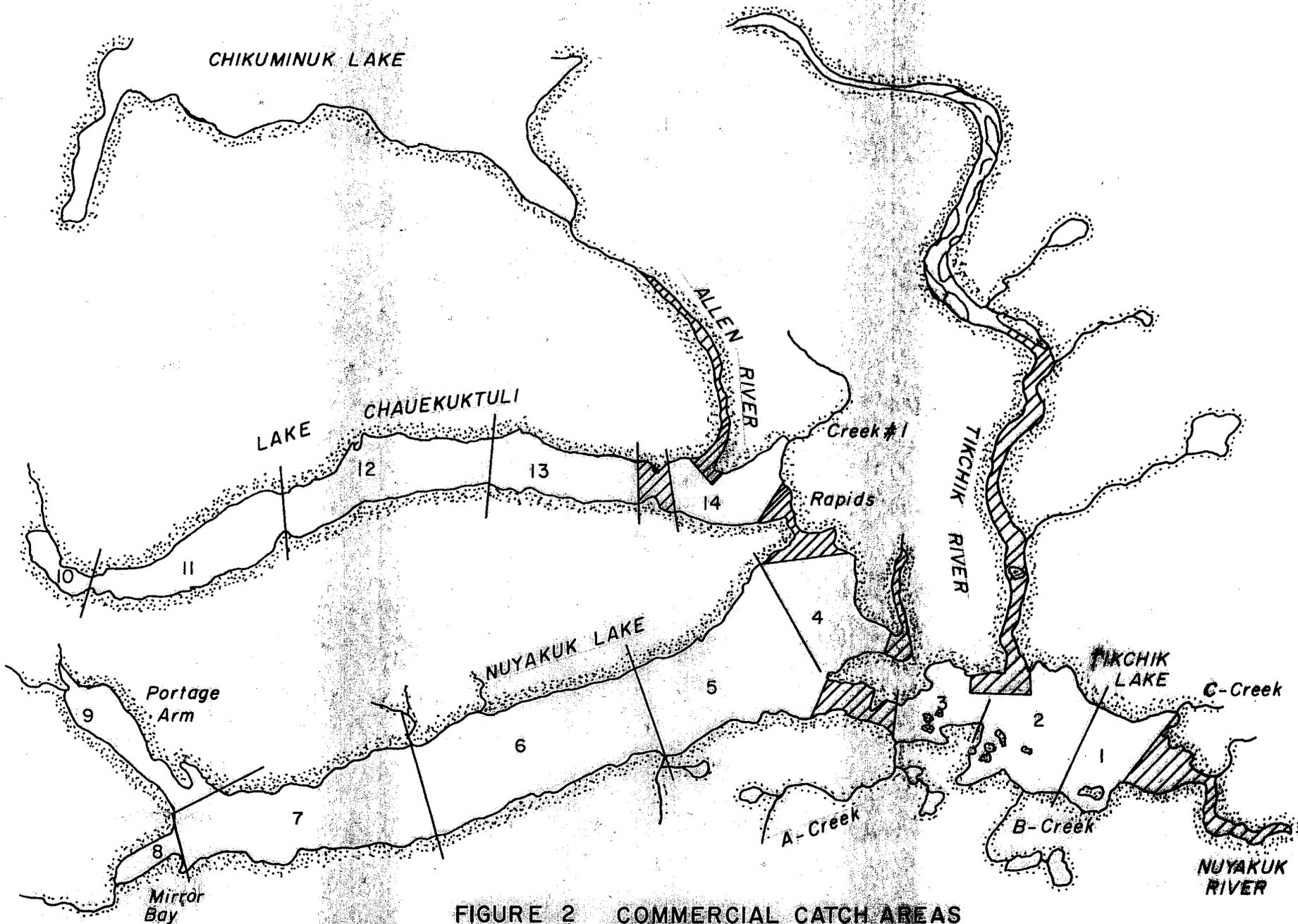


FIGURE 2 COMMERCIAL CATCH AREAS  
TIKCHIK LAKE SYSTEM  
BRISTOL BAY, ALASKA

 Closed to  
Commercial Fishing

scale 1:5 0 5 miles

Of the 17 species of fish found in the Tikchik Lake system, only humpback whitefish (Coregonus pidschian) and lake trout (Salvelinus namaycush) were taken in commercial quantities. Arctic char (Salvelinus alpinus), burbot (Lota lota) and northern pike (Esox lucius) were taken in smaller quantities (Table 2).

#### Spring, 1966

A total of 1,816 fish (7,714 pounds) was caught from April 15 to May 16, 1966. Two fishermen caught 1,218 humpback whitefish (4,834 pounds), 528 lake trout (2,864 pounds) and 16 pike (191 pounds), for a species composition of 67 percent whitefish, 32 percent lake trout and 1 percent pike. Average catch for each of the days fished was 38 humpback whitefish, 18 lake trout, and 0.5 pike or 56.5 fish of all species (Table 3).

Average round weight of fish caught was 4.0 pounds for humpback whitefish, 4.6 pounds for lake trout and 11.6 pounds for pike.

All fishermen used salmon gill nets during the spring of the year. Nets used in the fishery were 4-3/4", 5-3/8" and 8-1/2" stretch measure.

One grayling was caught during this fishery.

#### Fall, 1966

During the 22 days of fishing (September 22 to October 14) two fishermen caught 2,539 fish (12,726 pounds). The total catch was composed of 1,494 humpback whitefish (6,394 pounds), 710 lake trout (3,523 pounds), 298 pike (2,643 pounds) and 37 char (166 pounds). Species composition was similar to the spring fishery. An average catch of 72 humpback whitefish, 34 lake trout, 15 pike and 2 char or 123 fish of all species were caught daily (Table 3).

Catch in fish per net hour was 0.67 for humpback whitefish, 0.32 for lake trout, 0.13 for pike and 0.01 for char or 1.13 fish per hour per standard net. Similar values were found by Burgner, et al, 1965. Catch in pounds per hour was 2.88 for humpback whitefish, 1.59 for lake trout, 1.19 for pike and 0.07 for char, or 5.73 pounds per hour per standard net.

Average weight of fish were 4.1 pounds for humpback whitefish, 4.8 pounds for lake trout, 9.0 pounds for pike and 4.5 pounds for char.

Commercial fishermen fished other lakes for the first time during this period. Nuyakuk Lake and Lake Chauekuktuli were fished for a short time. Catches were so small that they were combined with those of Tikchik in this report.

Four rainbow trout and six grayling were caught during this fishery.

#### Spring, 1967

Three to four fishermen caught 555 fish (2,444 pounds) during the 28 days of fishing (March 13 to April 9). Fish caught by species were 326 humpback whitefish (1,304 pounds), 210 lake trout (1,055 pounds), 2 char (8 pounds), 2 pike (30 pounds) and 15 burbot (47 pounds). Again species composition was similar to the spring and fall fishery of 1966 (Table 3). The average daily

Table 2. List of Common and Scientific Names of Fishes Collected by Fisheries Research Institute Personnel in the Tikchik Lake System.\*

Common Name	Scientific Name
Least cisco	<u>Coregonus sardinella</u>
Humpback whitefish	<u>Coregonus pidschian</u>
Pygmy whitefish	<u>Prosopium coulteri</u>
Round whitefish	<u>Prosopium cylindraceum</u>
Pink salmon	<u>Oncorhynchus gorbuscha</u>
Chum salmon	<u>Oncorhynchus keta</u>
Coho salmon	<u>Oncorhynchus kisutch</u>
Sockeye salmon	<u>Oncorhynchus nerka</u>
Chinook salmon	<u>Oncorhynchus tshawytscha</u>
Rainbow trout	<u>Salmo gairdneri</u>
Arctic char	<u>Salvelinus alpinus</u>
Lake trout	<u>Salvelinus namaycush</u>
Arctic grayling	<u>Thymallus arcticus</u>
Northern pike	<u>Esox lucius</u>
Burbot	<u>Lota lota</u>
Threespine stickleback	<u>Gasterosteus aculeatus</u>
Ninespine stickleback	<u>Pungitius pungitius</u>
Slimy sculpin	<u>Cottus cognatus</u>

\* Burgner, et al, 1965.

Table 3. Summary, Tikchik Lake, Commercial Catch.

	Spring, 1966	Fall, 1966	Spring, 1967
No. of Nets Fished	2 to 6, mesh size 4-3/4" - 5-3/8" - 8-1/2"	2 to 10, mesh size 4-3/4" - 5-3/8"	2 to 9, mesh = all 5-1/2"
No. of Fathoms	100 to 300	100 to 475	100 to 450
No. of Days Fished	32 (approximate)	22 (approximate)	28 (approximate)
No. of People Fishing	2	2	3 to 4
Average Catch Per Day	38 whitefish, 18 lake trout, 0.5 pike; 1 grayling caught for entire period. Daily total: 56.5 all species.	72 whitefish, 34 lake trout, 15 pike, 2 char; 15 burbot, 4 rainbows, 6 grayling were caught for the entire period. Daily total: 123 fish of all species.	11 whitefish, 8 lake trout, 2 char, 2 pike and 15 burbot were caught during the entire period. Daily total: 19 fish of all species.
Catch by Lake	Tikchik - 1,816: 100%	Tikchik - 2,385: 88% Nuyakuk - 285: 11% Chauekuktuli - 34: 1%	Tikchik - 555: 100%
Species Composition	Whitefish - 67% Lake trout - 32% Pike - 1%	Whitefish - 59% Lake trout - 28% Pike - 12% Char - 1%	Whitefish - 59% Lake trout - 38% Pike - 0.4% Char - 0.4% Burbot - 3%
Total No. of Fish Caught	1,218 Whitefish 582 Lake trout 16 Pike <u>1,816 Total</u>	1,494 Whitefish 710 Lake trout 298 Pike 37 Char <u>2,539 Total</u>	326 Whitefish 210 Lake trout 2 Pike 2 Char 15 Burbot <u>555 Total</u>

Table 3. Summary, Tikchik Lake, Commercial Catch (Continued).

	Spring, 1966	Fall, 1966	Spring, 1967
Total No. of Pounds Caught	4,834 Whitefish 2,689 Lake trout 191 Pike <u>7,714</u> Total	6,394 Whitefish 3,523 Lake trout 2,643 Pike 166 Char <u>12,726</u> Total	1,304 Whitefish 1,055 Lake trout 30 Pike 8 Char 47 Burbot <u>2,444</u> Total
Total No. of Hours Fished		2,217	2,424
No. of Fish Per Hour *		0.67 Whitefish 0.32 Lake trout 0.13 Pike 0.01 Char <u>1.13</u> Total	0.13 Whitefish 0.08 Lake trout Trace of Char, Pike, Burbot <u>0.21</u> Total
No. of Pounds Per Hour		2.88 Whitefish 1.59 Lake trout 1.19 Pike 0.07 Char <u>5.73</u> Total	0.53 Whitefish 0.44 Lake trout Trace of Char, Pike, Burbot <u>0.97</u> Total

\* One fishing hour equals one hour fishing time with 50 fathoms of gill net.

catch was 11 humpback whitefish and 8 lake trout or 19 fish of all species per day. Catch per hour per standard net was 0.13 for humpback whitefish, 0.08 for lake trout and a total hourly catch of all species of 0.21. Average weights of fish were 4.0 pounds for humpback whitefish and 5.1 pounds for lake trout.

During this fishery all nets used were special "diver" nets of 5-1/2" stretch mesh.

No rainbow and grayling were caught during this fishing period.

### Fishery Summary

During 1966 and 1967 a total of 4,910 fish of all species (22,884 pounds) were caught during 82 days of fishing. The species composition of the catch was 3,038 humpback whitefish (12,532 pounds), 1,502 lake trout (7,267 pounds), 316 pike (2,864 pounds), 39 char (174 pounds) and 15 burbot (47 pounds). Overall species composition was 62 percent humpback whitefish, 30 percent lake trout, 6 percent pike, 1 percent char and 0.3 percent burbot.

Average hourly catch was 0.39 for humpback whitefish (1.7 pounds), 0.19 for lake trout (1.0 pounds), and 0.06 for pike (0.6 pounds) and a total of 0.66 fish of all species (3.3 pounds). Hourly catch figures used were from the fall 1966 and spring 1967 data, since no hourly effort data was collected during the spring fishery of 1966. The daily average catch for the entire fishery was 37 humpback whitefish and 18 lake trout, or a total of 55 fish of the major two marketable species.

Two different types of gear were used during the fishery; salmon gill nets and special "diver" nets.

Four rainbow trout and seven grayling were caught during the fishery.

The Fisheries Research Institute (F.R.I.) of the University of Washington conducted an ecological survey of Tikchik Lake, Nuyakuk Lake and Lake Chauekuk-tuli in 1964 and 1965. Variable mesh gill nets (1", 1-3/4", 1-5/8", 2", 2-1/2", 3", and 4" stretch measure) were used in the studies (Burgner, et al, 1965). During 1964, 54 lake trout and 70 humpback whitefish were caught in Tikchik Lake for an hourly catch of 0.05 for lake trout and 0.66 for humpback whitefish; a total of 1.27 per hour. In 1965, a total of 20 lake trout and 12 humpback whitefish was caught in Tikchik Lake for an hourly catch of 0.51 lake trout and 0.30 humpback whitefish; a 0.82 per hour total (Reeves, 1967, unpublished). Although not entirely comparable, these catch per hour rates are similar to those of the commercial freshwater fishery.

The average weight of fish caught in Tikchik Lake during 1964 by F.R.I. personnel was 3.8 pounds for humpback whitefish and 4.3 pounds for lake trout (Burgner, et al, 1965).

### SAMPLING OF THE COMMERCIAL CATCH

The Alaska Department of Fish and Game initiated a sampling program during the spring of 1966 to monitor this experimental fishery. The sampling program was continued during the fall of 1966 and spring of 1967. Two methods of sampling were utilized. During the spring and fall of 1966, sampling was conducted

at Dillingham, since all catches were flown in and processed in Dillingham. Length, weight, sex and parasitism were recorded as well as obtaining scales for age analysis. During the spring fishery of 1967 a Department biologist was located at Tikchik Lake to record catch data on all species taken but not necessarily shipped for market. Length, weight and external parasitism were recorded along with scale and branchiostagal ray samples. No sex determination or internal parasitism observations were made because all fish were flown out in the round.

Branchiostegal rays were collected from lake trout for aging purposes. Age determinations through this method did not prove satisfactory. Consequently, all ages were recorded from scales.

## BIOLOGY

### Age Composition

Scales were taken from 191 lake trout taken in the Tikchik Lake commercial fishery during 1966 and 1967. Lake trout in age classes V through XI were collected.

Age composition of lake trout during 1966 and 1967 were very similar. Approximately 90 percent of the fish fell within age groups VI through VIII.

LAKE TROUT AGE CLASSES BY NUMBERS OF FISH CAUGHT							
YEAR	V	VI	VII	VIII	IX	X	XI
1966	1	24	39	29	6	1	1
1967		20	38	22	8	1	1

The F.R.I. researchers found that 78 percent of the lake trout caught in 1964 and 72 percent caught in 1965 fell in age classes VI through VIII (Reeves, 1967, unpublished) (Table 4).

Humpback whitefish scales (249) were taken from the Tikchik Lake commercial fishery in 1966 and 1967. Age classes ranged from VIII through XVII years.

WHITEFISH AGE CLASSES BY NUMBERS OF FISH CAUGHT										
YEAR	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII
1966			7	12	28	31	29	18	15	1
1967	2	1	3	35	32	25	5	4	0	1

Table 4. Summary of Age Composition of Humpback Whitefish and Lake Trout from the Tikchik Lakes, 1964 and 1965.\*

Year	<u>Humpback whitefish</u>										Total
	Age Class										
	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	
1964											
No.	2	1	1	20	28	25	15	6	5	1	104
Per Cent	1.9	1.0	1.0	19.2	26.9	24.0	14.4	5.8	4.8	1.0	100.0
1965											
No.		2	2	7	10	13	7	4	2		47
Per Cent		4.3	4.3	14.8	21.3	27.6	14.8	8.5	4.3		100.0

Year	<u>Lake trout</u>											Total	
	Age Class												
	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	
1964													
No.		8	19	8	12		2						49
Per Cent		16.0	38.0	16.0	24.0		4.0						100.0
1965													
No.	1	6	17	34	30	16	3	1	1	1	1	1	112
Per Cent	0.9	5.4	15.2	30.3	26.8	14.3	2.6	0.9	0.9	0.9	0.9	0.9	100.0

\* Reeves, 1967, unpublished data.

The majority (70 percent or better) of the humpback whitefish fell in age groups XI through XIV for the commercial fishery.

During 1964 and 1965 F.R.I. found that only 49 percent and 55 percent of the humpback whitefish fell in age groups XI through XIV. The greater percentages of fish in the younger age group can be explained by the smaller mesh nets employed by F.R.I. (Reeves, 1967, unpublished).

### Sex Composition

Data on sex ratios were collected only during the spring and fall of 1966, when the fish were processed. Humpback whitefish were found to have a ratio of 47 percent males and 53 percent females while lake trout were 40 percent males and 60 percent females. The F.R.I. derived sex ratios only for 1964 on Tikchik Lake. Sex ratios for humpback whitefish were 57 percent males and 43 percent females; 53 percent males to 47 percent females for lake trout (Reeves, 1967, unpublished).

### Length and Weight

Lake trout growth rates coincide very closely with that of lake trout from a relatively unexploited lake trout fishery in Great Slave Lake (Kennedy, 1954).

During 1966 and 1967 the most frequently caught lake trout had a size range of 500 to 575 mm, while in 1964 an additional size range of 500 to 525 mm were also caught in abundance. This condition may be due to the fact that during F.R.I. sampling in 1964, variable mesh gill nets were used with the largest mesh being 4" stretch measure. During 1966 and 1967 the smallest mesh size was 4-3/4" stretch measure.

The predominant size group of humpback whitefish was 525 mm for 1964, 1966 and 1967.

### Parasitism

It has been found that lake trout were more highly parasitised externally while humpback whitefish were highly parasitised internally. Copepods (Salmincola sp.) were prominent on lake trout in the oral and buccal cavities. Copepods were not found in large number on whitefish. Tape worms were more widely found in whitefish than in lake trout (Casey, 1966, unpublished). Cestodes were commonly found in both lake trout and whitefish.

A few lake trout were observed in poor condition (large heads and slender bodies) during the 1967 fishery, but no internal investigations were made due to the fact all fish were marketed in the round. It is assumed that these fish were highly parasitised as were the Arctic char in the Iliamna Lake fishery during 1964 (Metsker, 1967).

## ASSOCIATED STUDIES

### Fisheries Research Institute

In June and July, 1964, and again in 1965, the F.R.I. of the University of Washington sampled Tikchik Lake, Nuyakuk Lake and Lake Chauekuktuli.

In addition to humpback whitefish and lake trout, round whitefish were caught.

The average age group of lake trout caught in Tikchik Lake was age class VI which coincided with age classes of fish caught in Nuyakuk and Chauekuktuli. Humpback whitefish in age classes IX, X, and XI constituted the bulk of the fish caught in all three lakes.

During 1965, lake trout age classes ran from VI through VIII with VII the predominant age class for all three lakes while the bulk of humpback whitefish were in age class XI (Reeves, 1967, unpublished).

Lake trout catches were consistently high in all three lakes; 40.3 percent in Tikchik Lake, 42.9 percent in Nuyakuk Lake and 53.4 percent in Lake Chauekuktuli.

Whitefish, both humpback and round, made up the bulk of the remainder of the catch with 52.3 percent humpback whitefish in Tikchik Lake and 28.3 percent humpback whitefish in Nuyakuk Lake and 33.9 percent round whitefish in Lake Chauekuktuli.

#### Canadian Studies

Canadian studies were reviewed to provide a comparison with findings from the Tikchik Lakes.

Kennedy, 1945, found that during 1945 the majority of lake whitefish caught in Great Bear Lake fell in age class IX which is quite similar to those of the Tikchik Lakes. Gill nets of variable mesh were used (2-1/2", 3", 4", 5" and 5-1/2"). It was also found that lake whitefish preferred the mouths of rivers rather than the lake itself.

Kennedy, 1953, found two populations of lake whitefish in Great Slave Lake. One population had a large number of individuals in age group XII while the other was in age group XIV. These were taken from the commercial fishery during 1946 through 1949.

Sex ratios were determined to be approximately 1:1. It has also been noted that selectivity of gill nets capture the larger fish in each age class (Kennedy, 1953).

#### Sport Fishery

At the present time there are two sport fishing camps on Tikchik Lake. One operator has one cabin that has been in use for some time and three other cabins that have been built recently. The other operator has one cabin that has been used for some time. Fishing is generally good at the outlets of the lakes and at the mouths of inflowing and outflowing rivers.

The Allen River, the narrows between Tikchik and Nuyakuk Lakes, the narrows on Lake Chauekuktuli, Tikchik River and the Nuyakuk River are excellent areas for grayling and rainbow trout. Certain of the above stated areas are good for one species of fish (grayling or rainbow trout) while others are not. Large lake trout are caught by trolling in Nuyakuk and Tikchik Lakes. Rainbows are

not found farther north than the narrows between Tikchik and Nuyakuk Lakes. It has been reported, but not substantiated, that some rainbows are taken in the east end of Nuyakuk Lake.

Figure 2 shows the areas closed to commercial fishing which coincide with areas of concentrations for sports fishing.

Rainbow trout and grayling, two of the fishes important to the recreational fishery were not found in areas where lake trout and whitefish are found. These species usually frequent areas of swift and fairly shallow water while the others do not. Ecologically speaking it appears that during the period sampled, rainbows and grayling in appreciable numbers do not inhabit the same ecological niche as do lake trout and whitefish.

### Problems

Marketing was a major obstacle until good samples of whitefish were sent out to prospective buyers. The fish were reported to be of excellent quality. A problem still exists if the same situation arises as that of 1967 where the producers could not supply enough fish to the buyer. If this situation should continue, prospective buyers will hesitate to commit themselves to the producers.

The most obvious problem confronted by the fishery is that of transportation. The only means of transportation from the lakes to Dillingham is by aircraft, as no airstrip is presently available at the Tikchiks. Consequently, aircraft must be equipped with floats in the summer and skis in the winter. There is also a period of "freeze-up" and "break-up" when the lakes are inaccessible. After reaching Dillingham the fish must be air freighted on to market, either to Anchorage or to other states from Anchorage.

Fishing itself presented a problem when the fish were apparently unavailable. From catch records of 1966 and 1967 it seems probable that fish move to other areas of the lakes at different times of the year. The largest catches were made in the fall of the year, coinciding with concentrations of fish near or on the spawning grounds. Spring catches for 1967 were lower than that of the spring of 1966. The spring fishery of 1967 terminated a month earlier than that of 1966. This might be a possible explanation as to why catches were so low in 1967. It is probable that the fish do not start feeding until late spring and consequently are not moving and not available to the fishery.

At this point no conclusion can be reached as to how much fishing pressure the lakes could withstand and what the possible production of the lakes would be. More studies should be initiated before any sustained yield production figures can be attained.

#### ACKNOWLEDGEMENT

The author wishes to thank the following people and organizations who provided information and assistance during this study:

- 1) Division of Sport Fish, Alaska Department of Fish and Game
- 2) Division of Commercial Fisheries, Alaska Department of Fish and Game
- 3) Michael L. Nelson, Commercial Fishery Biologist
- 4) Commercial fishermen who fished Tikchik Lake.

LITERATURE CITED

- Burgner, R. L., D. E. Rogers and Jerry Reeves. 1965. Observations of Resident Fishes in the Tikchik and Wood River Lake Systems. University of Washington Publications in Fish. Cir. No. 229., 14 pp.
- Casey, C. W. 1966. Tikchik Freshwater Commercial Fishery catch Sampling report, unpublished, Alaska Department of Fish and Game.
- Gaudau, E. L. 1966. Mineral Study of the Four Lake Systems in the Nushagak District of Alaska. M. S. Thesis, University of Washington, 229 pp.
- Kennedy, W. A. 1949. Some observations on the Coregonine Fish of Great Bear Lake, N. W. T., Bulletin, Fisheries Research Board of Canada, LXXXII (1949), 10 pp.
- \_\_\_\_\_. 1953. Growth, Maturity, Fecundity and Mortality in the relatively unexploited white fish (Coregonus clupeaformis), of Great Slave Lake, Journal, Fisheries Research Board of Canada. 10 (7): 413.
- \_\_\_\_\_. 1954. Growth, Maturity and Mortality in the relatively unexploited Lake Trout, (Cristovomer namaycush), of Great Slave Lake, Journal, Fisheries Research Board of Canada, 11 (6): 831.
- Metsker, Howard. 1967. Iliamna Lake Watershed Freshwater Commercial Fisheries Investigation of 1964. Alaska Department of Fish and Game. Informational Leaflet No. 95., 50 pp.
- Reeves, J. 1967. Resident Fish Data from the Tikchik Lakes, 1964 and 1965. Fisheries Research Institute. Unpublished data. 42 pp.

The Alaska Department of Fish and Game administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfax Drive, Suite 300 Webb, Arlington, VA 22203 or O.E.O., U.S. Department of the Interior, Washington DC 20240.

For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-6077, (TDD) 907-465-3646, or (FAX) 907-465-6078.